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SOCIAL INEQUALITIES IN MENTAL HEALTH AND MORTALITY AMONG REFUGEES AND OTHER IMMIGRANTS TO SWEDEN

- EPIDEMIOLOGICAL STUDIES OF REGISTER DATA

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1940 VIII

Auf der Flucht vor meinen Landsleuten
Bin ich nun nach Finnland gelangt. Freunde
Die ich gestern nicht kannte, stellten ein paar Betten
In saubere Zimmer. Im Lautsprecher
Höre ich die Siegesmeldungen des Abschaums. Neugierig
Betrachte ich die Karte des Erdteils. Hoch oben in Lappland
Nach dem Nördlichen Eismeer zu
Sehe ich noch eine kleine Tür.

1940 VIII (Translation)

In my attempt to escape from my countrymen
I have now arrived in Finland. Friends,
Whom I did not know yesterday, placed beds for us
In clean rooms. Through the loudspeaker
I hear the victory announcements of the scum. Curious,
I gaze upon the map of the continent. High up in Lapland,
Towards the northern polar sea,
I still perceive a small door.

Berthold Brecht 1898-1956, author, dramatist, poet, and political refugee from Germany to Scandinavia 1933-1941

ABSTRACT

This thesis aimed to increase knowledge, using population-based registers, of how pre- and post-migration factors and social determinants of health are associated with inequalities in mental health and mortality among refugees and other immigrants to Sweden.

It addressed four research questions: (1) Are there differences in mental health status between refugees and non-refugee immigrants, and could the hypothesised differences explain mental health differences between immigrants from different countries or areas of origin? (2) Do refugee immigrants have higher mortality rates than non-refugee immigrants? (3) Does the combination of general social determinants of health and post-migration factors increase inequalities among men and women in the relative risk of hospitalisation because of depressive disorder? (4) Are there gender differences in how pre- and post-migration factors and social determinants of health are associated with mental health among immigrants?

Study I & II had cross-sectional designs and used logistic regression analysis to study differences in mental health status between refugee and non-refugee immigrants. In **Study I**, there was a significant difference in poor mental health (measured by prescribed and purchased psychotropic drugs) between female refugees and non-refugees (OR = 1.27; CI = 1.15–1.40) when adjusted for socioeconomic factors. This difference was not present among males. In **Study II,** refugee men had a higher likelihood of poor mental health than non-refugees and the Swedish born. Female immigrants had a higher likelihood of poor mental health than Swedish-born women. Adjusted for socioeconomic factors, refugees of most origins had a higher likelihood of poor mental health than non-refugees of the same origin. **Study III** had a cohort design and analysed mortality rates among non-labour immigrants, using Cox regression analysis. Male refugees had a higher relative risk of mortality from cardiovascular disease (HR = 1.53; CI = 1.04–2.24) and external causes (HR = 1.59; CI = 1.01–2.50) than male non-refugees did, adjusted for socioeconomic factors. **Study IV** had a cohort design, used Cox regression, and included the population with a strong connection to the labour market in 1999 to analyse the relative risk of hospitalisation due to depressive disorder following unemployment. The lowest relative risk of depressive disorder was found among employed Swedish-born men; the highest risk was among foreign-born females who experienced unemployment during follow-up (HR = 3.47; CI = 3.02–3.98).

In conclusion, immigrants, and particularly refugees, have poorer mental health than native Swedes. Refugee men have a higher relative mortality risk for cardiovascular disease and external causes of death than do non-refugees. The relative risk of hospitalisation due to depressive disorder following unemployment was highest among immigrant women. In order to promote mental health and reduce mortality among immigrants, it is important to consider pre- and post-migration factors as well as the general social determinants of health.

LIST OF PUBLICATIONS

I. Hollander A-C, Bruce D, Burstrom B, Ekblad S: Gender-related mental-health differences between refugees and non-refugee immigrants—A cross-sectional register-based study. *BMC Public Health* 2011, 11(1):180.

II. Hollander A-C, Bruce D, Burstrom B, Ekblad S: The association between immigrant subgroup and poor mental health—A population-based register study. Accepted for publication in *Journal of Nervous and Mental Diseases*

III. Hollander A-C, Bruce D, Ekberg J, Burstrom B, Borrell C, Ekblad S: Longitudinal study of mortality among refugees in Sweden. *International Journal of Epidemiology* 2012, 41(4):1153–1161.

IV. Hollander A-C, Bruce D, Ekberg J, Burstrom B, Ekblad S: Hospitalisation for depressive disorder following transition to unemployment—Differentials by gender and immigrant status. A population-based cohort study in Sweden. (Manuscript).

CONTENTS

LIST OF ABBREVIATIONS

CI	Confidence Intervals
EES	European Economic Area
HR	Hazard Ratio
ICD	International Classification of Diseases
LISA	Longitudinal integration database for health insurance and labour market studies
OR	Odds Ratio
OECD	Organisation for Economic Co-operation and Development
PTSD	Post-Traumatic Stress Disorder
SMB	The Swedish Migration Board
SD	Standard Deviation
SEK	Swedish Krona, the currency of Sweden
STATIV	Longitudinal database for studies of the immigrants' integration
UNHCR	United Nations High Commission for Refugees

1 INTRODUCTION

Research in epidemiology studies patterns and distribution of health outcomes and their determinants or impacts in distinct populations. Epidemiology is central to public health research and is used for policy and evidence-based medicine. Studies of differences in the distribution of the social determinants of health—such as socioeconomic conditions, living and working conditions, and social networks—are the basis for research on social inequalities in health. Migration is a global, ancient, and public phenomenon and, at the same time, local, contemporary, and personal. This multifaceted nature makes the study of social determinants of health among immigrants difficult.

Sweden keeps official population-based registers of a high standard, adapted for health research and suitable for studies of the social determinants of health. These registers provide an opportunity to study immigrant-specific determinants of health that would be more difficult to study in other settings.

Immigration has made Sweden a more open, modern, and cosmopolitan society. Adults who were born in other countries and have moved to and settled in Sweden are the focus of this thesis. This group will be referred to as *immigrants* or *foreign-born* throughout the thesis. These terms are not without problems, however, other terms are also problematic. *Swedish born* will be referred to this way or as *natives*. *Natives* potentially could be interpreted in a derogatory way, although this is not the intention. All persons who have been granted residence because the Swedish Migration Board considers them as being in need of asylum will be referred to throughout the text as *refugees*. Persons who have been granted a residence permit in Sweden for other reasons have the same rights in Sweden as refugees; hence, the term specifies only the reason for immigration.

In 2013, the number of refugees from war-torn countries is surging. Not since the end of the Balkan wars have there been so many people in need of asylum in Sweden. This project was initiated while I was working and writing my master's thesis in clinical psychology in Tajikistan in 2006[1]. Meeting Tajiks who had survived the civil war and were trying to cope with traumatic memories in a postwar country marked by corruption and poverty made me interested in the social determinants of mental health and its consequences. Thanks to my main supervisor, Associate Professor Solvig Ekblad, I got the opportunity to be a Ph.D. student in the research group Equity and Health Policy of my co-supervisor, Professor Bo Burström. I am so grateful for this opportunity!

[1] The master's thesis was later adapted to an article: Hollander A-C, Ekblad S, Mukhamadiev D, Muminova R. The validity of screening instruments for posttraumatic stress disorder, depression, and other anxiety symptoms in Tajikistan. J Nerv Ment Dis. 2007 Nov; 195(11):955–58.

2 BACKGROUND

2.1 SOCIAL DETERMINANTS OF HEALTH AMONG IMMIGRANTS

2.1.1 Social determinants of health

Ill health is often described as a matter of proximal factors such as genetics or infections. Nonetheless, distal factors such as the environment and the surrounding society also affect health (1) in high-, middle-, and low-income countries (2). Socioeconomic conditions, living and working conditions, and social networks are among the social determinants that influence health (1). Many have described the relationship between the social determinants and health (3). Figure 1 depicts this relationship according to a model by Dahlgren and Whitehead (2).

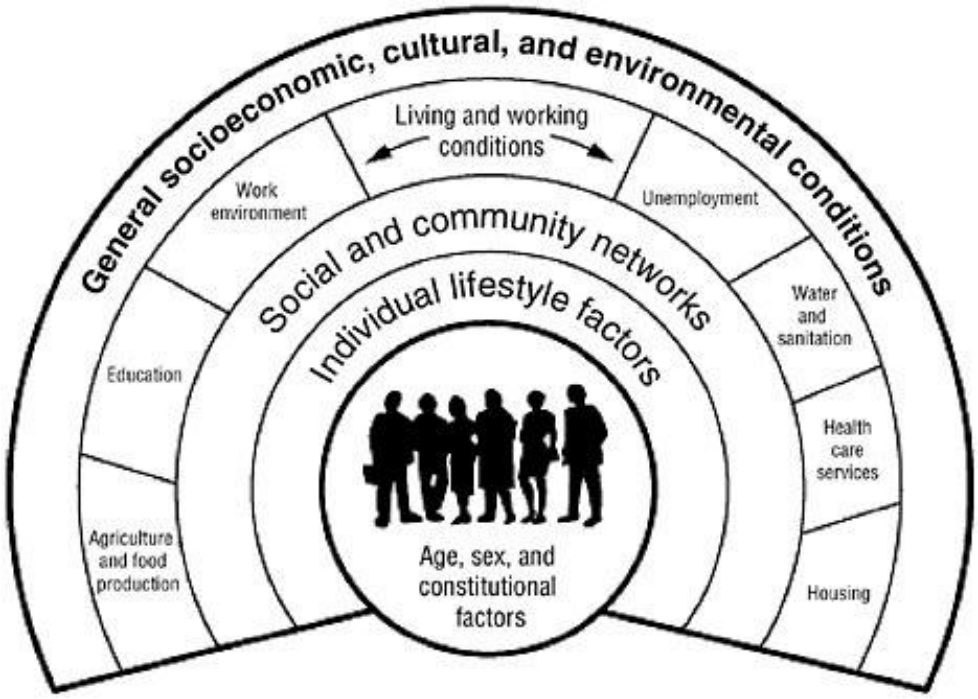


Figure 1: A model of the social determinants of health
Source: Dahlgren and Whitehead (1991) (2)

Numerous studies have described the positive association between socioeconomic status and health and longevity (1). The inverse association between ill health and socioeconomic status is known as the social gradient (1). The causal relationship between socioeconomic position and health has been debated. Does a low socioeconomic position cause poor health (causation) or does poor health cause a low social position (selection)? The relationship seems to work both ways, although there appears to be more support for the causation hypothesis (1).

The social determinants of health are relevant for all. If the social determinants of health are unevenly distributed, however, such as worse living conditions for one group or less healthy lifestyles for another, this may create social inequalities in health. Hilary Graham describes health inequalities as “health differences between individuals, health differences between populations and health differences between those occupying unequal positions in dominant

social hierarchies" (3, page 3). From the earliest studies in psychiatric epidemiology until today, psychiatric illness has been found to be positively associated with social adversity, too (4, 5). For depressive disorders, causation often explains the disorder, but for schizophrenia, the general explanation is selection (5).

2.1.2 Pre- and post-migration factors

The social determinants of health described above are relevant for everybody, including immigrants. An individual's move from one country or context to another means additional strain, however. Immigrant-specific social determinants of health are often separated into pre- and post-migration factors[2] (6). Post-migration factors overlap with general social determinants of health. However, studies show that measures of socioeconomic position that are valid in a native population are not always as valid in terms of immigrants' socioeconomic position (7, 8).

Malmusi writes "In economically advanced countries, theoretical and empirical research on health inequalities and on health among immigrants has generally developed in parallel, with few attempts to integrate the two fields. Migration and health issues have only been partially addressed within the health equity framework" (9, page 1610). The view, that migration and health issues needs to be integrated within the health equity framework, is supported by Ingleby too (10).

2.1.3 Factors modifying the associations

In epidemiology, modifying factors are those that regulate the level of association between the exposure and the outcome. The association between social determinants of health, pre- and post-migration factors, and mental health and mortality are not same for all. Different factors, such as ethnicity and gender and other factors, modify the association.

Ethnicity is a common variable in epidemiological studies on immigrants (11). Ethnicity is difficult to define in general, and particularly as a variable in an empirical study in epidemiology. Kohn et al. write, ". . . ethnic groups should reflect the requirements of the hypotheses and not just the convenient ethnic/cultural group classifications used in censuses and politically motivated data sources" (12, page 157).

Psychiatric diagnoses are determined without biomarkers. Compared with many other medical disciplines, psychiatry has a stronger cultural component to it. Perception and expression of mental health and the stigma surrounding it are different across cultures and contexts (13–16). Still, there is strong support for the idea that although poor mental health can have many expressions, it exists in similar forms cross-culturally (12, 15). The cultural component of mental ill health expressions and perceptions makes it more difficult to transfer immigrants' symptoms, as opposed to natives' symptoms, to valid DSM or ICD diagnoses (12, 17,18).

[2] In addition to pre- and post-migration factors, some typologies for health among immigrants also have migration factors separately. Migration factors are all factors happening during the actual migration or flight to the new country. In this thesis, the factors contributing to health that happen during migration or flight before entering the new country are included in pre-migration factors; factors happening within the new country, including the asylum-seeking period, are defined as post-migration factors.

In addition, there are differences in psychiatric health services utilisation between immigrants and natives (19). The differences could have multiple explanations, such as different prevalence patterns and lack of or cultural obstacles to access to care. In some immigrant groups, health literacy (20) is low because immigrants have little knowledge about health care in the new country (19). In the United Kingdom, but less so in Sweden, there has been an open debate about the presence of institutional racism in psychiatry (21–23). This debate could be relevant in Sweden as well, however.

Sex usually refers to the biologically determined division of men and women, whereas gender refers to the socially constructed ideas of what it implies to be a women or a man. As Bird (24) and Backhans (25) describe it, gender differences in health are neither biological only nor socially constructed only. In *The rising tide: Gender equality and cultural change around the world*, Inglehart and Norris examined how the 20th century gave rise to profound changes in traditional gender roles (26). They argue that gender roles have shifted in a two-step modernization process: first from agrarian to industrialized societies, with reduced fertility rates, to including women in the paid labour force, increasing literacy, and increasing education. The second step in the process moves from industrial towards post-industrial societies, with larger gender equality in the public spheres and workplaces. Inglehart and Norris—with the help of the United Nations Development Programmes' Human Development Report, The United Nations Organization for Education, Science and Culture, the International Labour Organization, and the InterParliamentary Union—clustered almost 70 nations with significant variations in the level of socioeconomic development, rates of democratization, and types of cultural region into agrarian, industrial, or post-industrial nations (26). Using data from the World Values surveys of public opinion (27) from 1981 to 2000, they found that countries in the same clusters had much in common when it came to attitudes towards gender roles. Women's role in the paid labour force, educational opportunities, and inclusion in public life as well as attitudes towards homosexuality, abortion, prostitution, and divorce were different if the society was agrarian, industrial, or post-industrial. According to Inglehart and Norris's terminology, many immigrants from low-income countries to high-income countries move from agrarian and industrial societies with more traditional gender roles to post-industrial countries.

The International Organisation for Migration describes how women are often seen as passive immigrants, whereas men are depicted as active, and how this representation colours perceptions of immigrants' needs (28). Female immigrants from countries in conflict are often assumed to be members of the refugee's family (29), despite the fact that an equal share of the world's refugees are women.

2.1.4 Intersecting social inequalities

Iyer et al. state, "It has gradually been recognized that different axes of social power relations, such as gender, socioeconomic position, discrimination and racism, are interrelated, not as additive but as intersecting processes" (30). The same authors suggest that in terms of health, each social dimension influences any other dimension of inequality taken by itself. Despite a living discourse of the intersections of social inequalities and health, and studies with qualitative approaches, there is a paucity of empirical studies on how social determinants of health interplay when combined (31). Llácer and colleagues highlight the lack of studies that link gender, migration, and health empirically, and they address the need to integrate a gender

perspective into epidemiological studies on migration and health (32). Ingleby also suggested an intersectional perspective in migration and health issues in order to include it in the health equity framework (10).

2.1.5 Pathways to social inequalities in health

Studies show that differences in the distribution of social determinants of health create social inequalities in health. The four most commonly discussed pathways between the unequal distributions of social determinants of health and health inequalities are material deprivation, psychosocial factors, health behaviours, and access to health and social care (2, 3, 33). In addition to the four commonly discussed pathways, studies focussing on refugee mental health often add trauma as part of the psychosocial factors (34). Psychosocial factors are an important pathway between social determinants of health and social inequalities in health among immigrants. Nazroo argues that psychosocial and material deprivation operates simultaneously to account for adverse health outcomes in ethnic minority and immigrant groups (9). Still, studies show that health behaviours and access to health and social care as well are pathways between pre- and post-migration factors and social determinants of health and of social inequalities in mental health and mortality among immigrants as well (3, 35–38).

2.2 PREVIOUS EMPIRICAL STUDIES

2.2.1 Pre-migration factors

Pre-migration factors could include the income level in the immigrant's country of origin (9) and the reason for immigration (such as the need for asylum, work, or family reunion) (39). Studies have shown that the reason for immigration is associated with the immigrant's health, particularly mental health. Labour immigrants have a lower prevalence of poor mental health than refugees do (40). Refugees are known to be a risk group for poor mental health (41, 42). Studies of wars and disaster sites show that the experience of wars and disasters is not in and of itself necessarily associated with severe psychological reactions; rather, it is the individual's personal experience and vulnerability that matter (43). Cumulative exposure to trauma has a clear connection to Post-traumatic Stress Disorder (PTSD) (44). Torture and PTSD are also found to have a strong correlation (44). In the DSM-IV (45), the criteria for PTSD and depression partly overlap. In reality, there is an overlap of the PTSD and depression in trauma-affected populations (46). In Norway, immigrants from low-income countries have a higher likelihood of psychological distress compared with those from high-income countries (47).

2.2.2 Post-migration factors

There are many post-migration factors that seem to be of importance; such as the amount of time in the new country (8, 9); social networks (13); language (13); acculturation status (13, 48); socioeconomic position in the new country (9, 13); status loss (8); labour market attachment (13, 47); and experience of discrimination and racism (49). For the immigrant group as a whole, time in the new country is associated with deteriorating health (9). One explanation of this could be that immigrants from low-income countries often reach only a low socioeconomic position; another explanation could be acculturation (9).

Some studies conclude that employment is a key factor for mental health among immigrants (8, 13); others do not find this to be so (50). The association between poor mental health and

unemployment has been explained by unemployment causing poor mental health (causation) and with poor mental health causing unemployment (selection), or both (51, 52). In two meta-analytic studies on the association between self-rated poor mental health and unemployment, the effect-size difference between unemployed and employed was moderate in terms of causation and smaller in terms of selection (51, 52). So far, the outcome when studying mental health in association with unemployment has been from screening scales such as the General Health Questionnaire (see for instance (53)), but rarely psychiatric diagnoses. There are some exceptions (54, 55), and these studies found similar results as for self-rated poor mental health. Both studies lacked the statistical power to detect a risk of depressive disorder because they studied too few cases.

There are specific post-migration factors for refugees. Studies show that long asylum procedures (56, 57) and arrival before family members and worries of family left back home (58) are associated with poor mental health. In a meta-analysis of mental health among refugees, Porter et al. found that the highest risk of poor mental health was among refugees for whom the possibilities of working were restricted; who were older; who had higher educational and better socioeconomic status before they sought asylum; who lived in institutions; and who were repatriated or experienced conflict that was not yet resolved (59). A study by Bogic et al. (60) has opposed the finding that a person with a higher education or socioeconomic status had a higher risk of poor mental health at resettlement. In some studies, time seems to reduce the effect of pre-migration stress; they suggest that the impact of it is considerably reduced after approximately ten years (46). Other findings, however, suggest a more prolonged process (61). Beiser identified unemployment as one of the most frequent post-migration factors refugees experienced (62).

Bogic et al. did an audit of psychiatric diagnoses among refugees from different countries in the former Yugoslavia who had moved to the United Kingdom, Italy, and Germany. They found that the war-related factors were related to PTSD and that post-migration factors were related to the rates of mood, anxiety, and substance abuse disorders (60). The associations found by Bogic et al. did not differ significantly across the countries. Lindencrona et al. found that pre-migration factors such as trauma had a larger impact on mental health than post-migration factors for refugees (34). When Steel et al. studied mental health among Tamil asylum seekers in Australia, trauma explained 20.3 percent of the variance and post-migration factors, 14.4 percent of the variance (63).

2.2.3 Gender differences

Gender differences in global self-rated health in high-income countries are small, except for mental health (25). If dependency diagnoses are included among mental health diagnoses, however, the gender gap is reduced considerably (25). Although women all over Europe have a higher likelihood of depression, there is a difference in how large the gap is between men and women. It is largest in some Eastern and Southern European countries and smallest in some of the Nordic countries, Slovakia, and Ireland (64). In many, but not all, countries and settings women have poorer health but outlive men (65).

2.2.4 Combining different social determinants of health

Wamala et al. tested the theory of intersectionality by combining the variable of being foreign born/Swedish born with gender (66). Swedish-born men had overall better self-rated health than Swedish-born women, who were better off than foreign-born men. Unexpectedly and not in concordance with the social gradient, foreign-born women with high-income levels were the worst-off category in terms of self-rated health.

2.2.5 Mental health among immigrants

The hypothesis that immigrants have a higher prevalence of schizophrenia and psychosis than natives was proposed, tested, and supported as early as 1932 (67). Back then, Ødegård found that the prevalence of psychosis among Norwegian immigrants to the United States was twice as high as that of Norwegians in Norway and of those born in the United States. These findings have been reproduced many times since (68), although the differences are not always very pronounced (69). In many of these studies, the heightened risk is associated not only with immigrants, but with ethnic minorities, too.

Common mental disorders refer to depressive disorders, anxiety disorders, obsessive-compulsive disorders and phobias. Studies have found that immigrants to the United States have lower levels of common mental disorders compared with natives, although this level seems to vary by country of origin and age at immigration (70–72). These lower levels compared with natives do not seem as apparent in Europe (41), although country-specific studies show conflicting results (73). In a population-based European study, Missinne et al. assessed the prevalence and determinants of depressive symptoms among immigrants, ethnic minorities, and natives in 23 European countries and included 36,970 respondents (73). The authors found that immigrants and ethnic minorities experienced more depressive symptoms than natives did in a majority of the countries. Socioeconomic factors explained most of the differences between immigrants and natives. In 2007, Swinnen et al. conducted a meta-analysis of population-based incidence studies on the association between migration and different forms of mood disorders including studies from Europe and Israel. Most studies dealt with hospital admissions for depression. The conclusion from the meta-analysis was that there is no evidence of elevated risks of mood disorders among immigrants (74).

Some researchers hypothesise that migration would be a risk factor for suicide, although many studies have found this it is still not firmly confirmed, according to Portzky et al. (75). There are ethnic differences in the risk of suicide in Sweden (76) and elsewhere (77, 78). Ethnic differences in suicide are not always in line with the expected social gradient (79).

There are differences between natives and immigrants in terms of utilisation of psychiatric out- and in-patient care in Sweden (37, 38). A Swedish study among an indigenous population found that reindeer-herding Sami had low confidence in the health-care system and that this was a significant obstacle to care (80). In the United Kingdom, South Asians have been found to be assigned mental health problems less often than white English despite similar symptoms (18).

2.2.6 Mortality among immigrants

Immigrants from low-income to high-income countries have, on average, a lower socioeconomic position than the native population (81). Still, immigrants often display a lower mortality (82–85) than both the native population and their compatriots back home (86, 87). One explanation for the superior health could be that high-income countries accept labour migrants because there is a need for them in the labour force. Being in the labour force requires good health. This selection hypothesis is coined 'The Healthy Migrant Effect'. Other theories are genetics (87), reverse selection (the unhealthy re-migration effect) (86), statistical artefacts (87), culture-based healthier lifestyles, stronger social bonds, and support from the country of origin (9). Immigrants' health deteriorates more rapidly with age than natives' health does with age (9). This deterioration could be explained by the social gradient because immigrants from low-income countries often end up in a low socioeconomic position.

Cardiovascular disease is more common in some immigrant groups in Sweden (88). There are also ethnic differences in mortality patterns (82–85, 89). A range of studies has shown that certain kinds of stress are associated with cardiovascular mortality: both acute stress, such as combat stress (90) and stress after earthquakes (91), as well as chronic stress, such as marital problems (92) and low-control, high-demand work situations (93).

2.2.7 Knowledge gaps

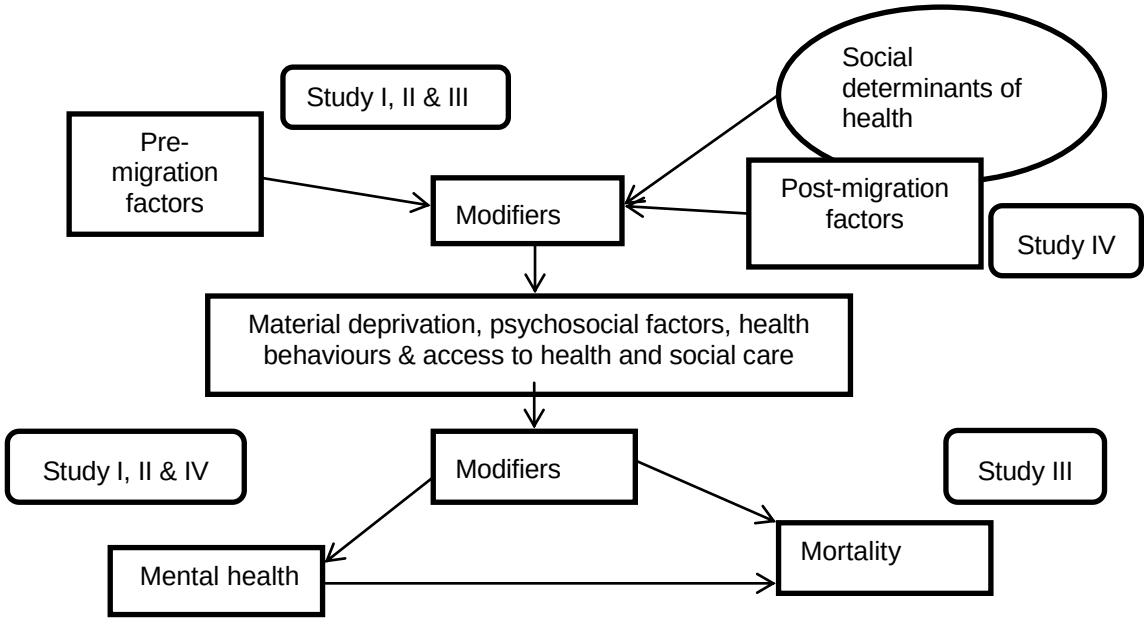
Mental health and mortality among immigrants do not always follow the pattern known as the social gradient. The frameworks of social determinants of health rarely include immigrant-specific determinants of health, except ethnicity (for an exposé of different frameworks for determinants of health, see (3)). Questions remain on how pre- and post-migration factors and social determinants of health are associated with inequalities in mental health and mortality among immigrants (9,10).

There are specific knowledge gaps, too. Few previous studies have compared refugees with non-refugees of the same origin who immigrated to the same country at the same time. Thus, there is a question whether the higher likelihood of poor mental health among immigrants from low-income countries to high-income countries could be attributed to refugee-specific pre-migration factors and whether there is an interaction between origin and mental health among refugees. Little is known about whether refugees to high-income countries have higher mortality than non-refugees have. In addition, there is a knowledge gap in how the combination of gender, being foreign born, and unemployment is associated with mental health.

2.3 A TENTATIVE FRAMEWORK

Figure 2 pictures a tentative framework for studying pre- and post-migration factors and general social determinants of health among immigrant populations.

Figure 2: Tentative framework



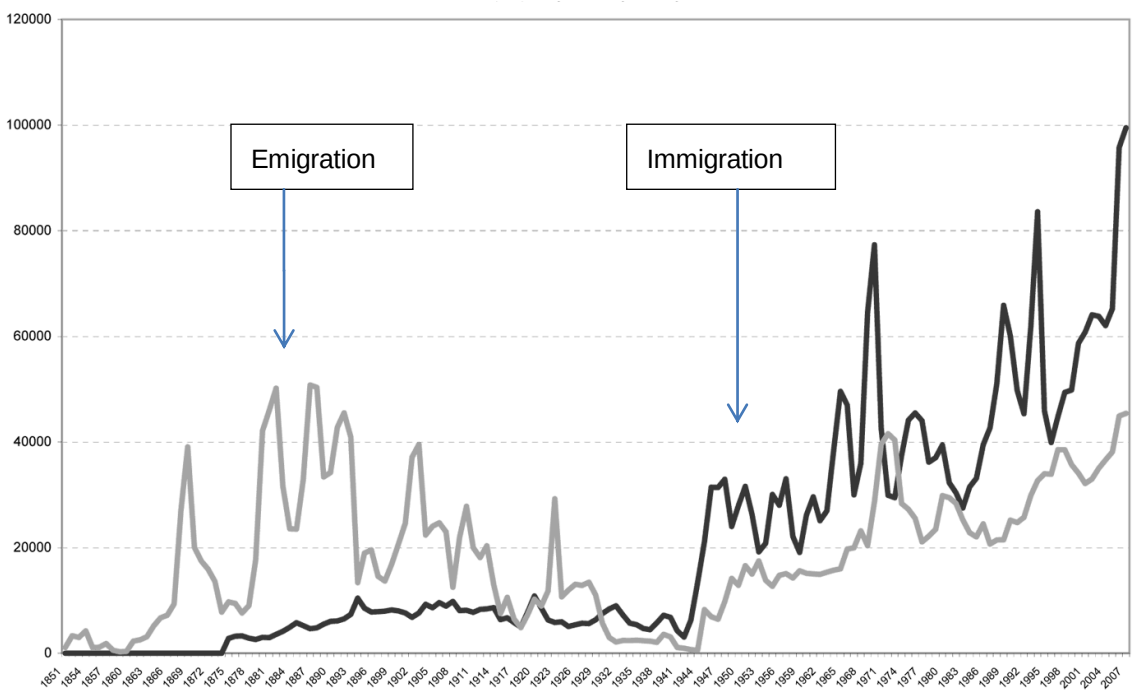
2.3.1 Immigrants to Sweden

In this thesis, the definition of an immigrant is one who is born abroad, but settles in Sweden, according to the Swedish bureau of official statistics, Statistics Sweden (94). This definition excludes children of immigrants born in Sweden (so-called second-generation immigrants), asylum seekers, and undocumented immigrants. For an overview of immigration to and emigration from Sweden, see Figure 3.

Sweden has a limited history of colonising other nations compared with other European countries (95). During the years 1851–1930 approximately 1.2 million Swedes emigrated from Sweden to North America (96) and other countries such as Germany (95). Sweden ended the emigration period during the 1930s (96) and adopted restrictive immigration policies, particularly against Jews trying to escape Hitler's Germany (97). Sweden was never drawn in to the World War II. After Denmark and Norway were drawn into the war in 1940, Sweden became less restrictive in admitting refugees (95). During the last years of the war, Sweden expanded their help to Nordic, Baltic, German, Polish, and Hungarian refugees (98).

From the late 1940s and into the beginning of the 1970s, immigration to Sweden was characterised by labour migration from; for instance, Finland, Germany, Poland, Greece, the former Yugoslavia, and Turkey (99). In the late 1960s, labour migration became more regulated and was permitted only if there was a documented shortage of staff in a particular field (102). These rules did not apply to Nordic citizens or refugees (95). After the military coup in Chile in 1973 and the years after, Chileans were granted asylum in Sweden (95). A large group of Assyrians also arrived in Sweden during these years (95). At the beginning of the 1980s, asylum seekers started coming from Iran, Iraq, Lebanon, Syria, Turkey, and Eritrea (95). Another group excluded from the restrictive immigration policies were relatives of earlier immigrants (100).

Figure 3: Immigration and emigration to Sweden 1850–2007, number of person per year
Source: Statistics Sweden



At the end of the Cold War and later when the Iron Curtain disappeared in 1989, large groups from the former East bloc countries sought asylum in Sweden (94). War started in the former Yugoslavia in 1991, and in 1992, the country was dissolved. Because of this dissolution, refugees from Europe came to Sweden in large numbers for the first time since World War II. At the same time, refugees started coming from Somalia. In the beginning of the 1990s, Sweden went through a major economic downturn that lasted until late in the decade (99).

In 1994, Sweden signed the European Economic Area (EES) agreement. This agreement made labour migration from the EES countries (the countries in the European Union plus Iceland, Norway, and Lichtenstein) to Sweden possible. Since the ratification of the EES agreement, the number of labour migrants from EES countries has increased steadily (101). Sweden became a full member of the Schengen Agreement in 2001. The agreement opened the borders between the 13, at the time, Schengen countries (Belgium, Denmark, Finland, France, Greece, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, Germany, and Austria) (94). This coincided with the opening of the Öresund Bridge between Denmark and Sweden (99). The combination meant easier access to Sweden and an increase in asylum seekers.

From the year 2000, old as well as new groups from the former Soviet Union as well as from several countries in Africa arrived (94). In 2003, the United States invaded Iraq, and Sweden granted asylum to a large group of Iraqis. Since then, the Iraqis have become the second largest immigrant group in Sweden, after the Finns. Since ten new countries, mostly from Eastern Europe, joined the European Union in 2004, labour migration has increased steadily (94). From March 31, 2006, residence permits granted for humanitarian reasons were renamed “particularly distressing circumstances” (in this thesis the term *humanitarian reasons* will be used

throughout), and were supposed to be granted restrictively. For population statistics in 2012, see Table 1. During recent years, about 15 per cent of the immigrants to Sweden have been Swedish born who previously emigrated but now returned. Also, more than 50% of those emigrating from Sweden are non-Swedish born (101).

Table 1: Swedish population statistics in 2012 (101)

Swedish population statistics in December 2012	
Population in Sweden 2012	9,522,998
Immigrants	About 1.4 million
% of population in 2012	15 %
% of population in 2000	11%
Immigrants in 2012 originating from	
Finland	166,723
Iraq	125,499
Poland	72,851
Yugoslavia	70,050
Iran	63,828
Bosnia-Herzegovina	56,290
Germany	47,800
Denmark	44,007
Turkey	43,909
Norway	43,058

2.3.2 Pre-migration factors

Register-based studies use data in official registers collected for generic purposes. Because of the register-based designs of the studies in this thesis, the variables are limited to what is accessible in the Swedish population registers. Pre-migration factors will be measured only as the reason for immigration—that is, being a refuge or not (study I, II, and III). In the studies, the definition of a refugee is according to the Swedish Migration Board (SMB) classifications, see Table 2.

The SMB offers asylum seekers a place to stay, restricted working permits, and, if needed, a small sum of money. An asylum seeker is entitled to emergency or urgent medical, dental, gynaecological, and prenatal care, as well as care in accordance with the Swedish Communicable Diseases Act. Other kinds of care and pharmaceuticals are at one's own expense (94). After they are granted a residence permit, non-refugees and refugees are offered the same health care and social benefits as other immigrants and native Swedes, and are accepted in the same courses in Swedish and labour market introduction programs as other immigrants (94). There are minor regional differences in introduction programs for refugee and non-refugee immigrants (94). In Sweden, the approval rate of asylum applications has gone down significantly. Of those applying in 1989, 80% were granted asylum; in 2002 the proportion was 17%; in 2012 the proportion was 30%. In a report, the Swedish Red Cross highlights that the criteria for granting asylum in Sweden are not gender sensitive (29). In Sweden from 1995 to 2011, asylum-seeking men had, on average, a 7.5% higher chance of being granted asylum than asylum-seeking women did.

Table 2: The definitions of a refugees and non-refugee in the thesis

Refugee				Non-refugee / Other immigrants		
Reason for residence permit	**Legal basis**	**Seeks / are granted asylum**	**Criteria**	**Reason for residence permit**	**Legal basis**	**Criteria**
Refugee status / Subsidiary protection status	Geneva Convention and / or the EU´s Qualifications Directive	In Sweden	Have reason to fear persecution in their native country due to race, nationality, religious or political beliefs, gender, sexual orientation, or membership in a particular social group.	Humanitarian reasons (Included in study II and III)	National Swedish laws	Circumstances in the immigrant's current life situation, i.e. the health status would deteriorate severely or the children of the immigrant would suffer by being returned; or the political situation in the country of origin has become threatening.
Status as a person otherwise in need of protection	National Swedish laws	In Sweden	Have a well-grounded fear of suffering the death penalty or torture, or need protection due to internal or external armed conflict or environmental disaster in their native country.	Family of refugees (Included in study I, II and III)	National Swedish laws	Family of refugees, such as partners/spouses and children.
Quota refugees are selected by the UNHCR and are assigned either of the statuses above	Either of the two above	In native country or refugee camp elsewhere. Permitted to stay in Sweden from the day of arrival	Quota refugees are selected on either of the criteria above and transferred from their native country or a refugee camp elsewhere with the help of the SMB.	Others (Included in study II)	EU-regulations/ National Swedish laws	All other immigrants.

2.3.3 Post-migration factors and social determinants of health

Because of the register-based design of the studies in this thesis, only a limited number of post-migration factors and social determinants of health could be measured. The only post-migration factor not overlapping with the general social determinants of health is the time spent in Sweden. Unemployment and education are used as indicators of general social determinants of health. The level of education is associated with better health in the native population (3). Lack of knowledge in Swedish at first, and later labour market discrimination in Sweden hinders immigrants from finding jobs matching their level of education (102). This mismatch could weaken the association between health and the level of education.

Despite their heterogeneous composition, immigrants, on average, have a harder time finding employment in Sweden than natives do (103). Stratified by gender, education, area of residence and origin, reason for migration, and time in Sweden, subgroups of immigrants have different access to the labour market (104). Refugee immigrants have a harder time finding employment in Sweden than other immigrant groups do (105). Female immigrants have higher unemployment rates than natives and male immigrants do (106).

2.3.4 Modifying factors

Swedish registers do not record race, culture, or ethnicity for ethical reasons but do register the immigrant's country of origin. Country or area of origin is sometimes used as a proxy for ethnicity. Because ethnic groups often straddle national borders, it can be argued that this is not a valid proxy for ethnicity. Few datasets, not even the large register-based datasets used in this thesis, have the statistical power to use each country of origin as a covariate or a stratum. In the studies presented below, immigrants' origin will be classified according to different principles. The simplest is native/immigrant (study IV). Another is by the immigrant's income level in their country of origin (native, OECD-country, non-OECD-country) (Study II, part 1). The rest are classified according to country or area of origin (different clusters for each study) as detailed as Statistics Sweden and statistical power allowed (Study I, II part 2, and III).

According to the United Nations Development Programmes' Gender Inequality Index in 2011, Sweden ranks as the most gender equal society worldwide (107). From World War II until the end of the labour migrant era in Sweden in the seventies, half of all labour immigrants coming to Sweden were women (108). During this period, foreign-born women had a higher employment rate than Swedish-born women (109). Now the situation is reversed, and foreign-born women have lower employment rates than both Swedish-born women and men and foreign-born men (103). One suggested explanation of the present difference in employment rate between native and foreign-born women is culturally based attitudes towards paid work among women; suggesting that foreign-born women would identify more with the homemaker role than Swedish-born women do (110). A study in 2012 found no support, for attitudes towards paid work being different between Swedish-born and foreign-born women in Sweden (110).

In Sweden, the major differences between women and men in terms of health are that women have more mental health problems and pain but more men commit suicide (111). Longevity differences between men and women are still evident in Sweden, but are decreasing as men's

life expectancy is increasing at a faster pace than women's (111). There are gender differences in mental health among immigrants. According to Akhavan, immigrant women have worse health than Swedish-born and foreign-born men (112). Akhavan's statement about the worse health among immigrant women in Sweden can be disputed because there are major differences in mental health among female immigrants from different countries. Women from Western Europe have levels of health on a par with those born in Sweden (111).

2.3.5 Combining different social determinants of health

In terms of mental health following unemployment, there are different hypotheses of risk groups. One theory suggests that traditional gender roles could protect women from the mental health consequences of unemployment. The rationale is partly that females identify themselves more with the role of homemaker and less that of breadwinner (the role theory) (52). The role theory has been adapted to the Swedish setting. The adapted hypothesis suggests that women from countries with more traditional gender roles than are prevalent in Sweden have a lower risk of poor mental health than Swedish-born women and Swedish- and foreign-born men, following transition to unemployment.

Backhans et al. proposed another theory, based on a theory by Diderichsen (113), regarding risk or protective factors for mental health following unemployment. According to their theory, socioeconomic advantage or disadvantage creates different susceptibilities for poor mental health (25). This implies that socioeconomically disadvantaged persons will have a higher risk of poor mental health following unemployment compared with more privileged persons. The rationale is that financial and socioeconomic disadvantages are pre-existing risk factors for poor mental health, and involuntary job loss increases both financial and socioeconomic disadvantages. Immigrant women in Sweden, on average, are socioeconomically disadvantaged compared with natives and foreign-born men (101). According to role theory, immigrant status would be protective for women in the case of unemployment. According to the theory of social disadvantage, immigrant status would be a risk factor for women in case of unemployment.

3 OVERARCHING AIM

To increase knowledge of how pre- and post-migration factors and social determinants of health are associated with inequalities in mental health and mortality among refugees and other immigrants to Sweden.

Research questions:

1) Are there differences in mental health status between refugees and non-refugee immigrants, and could the hypothesised differences explain mental health differences by country or area of origin? (Study I and II)

2) Do refugee immigrants have higher mortality rates than non-refugee immigrants? (Study III)

3) Does the combination of general social determinants of health and post-migration factors increase inequalities among men and women in the relative risk of hospitalisation due to depressive disorder? (Study IV)

4) Are there gender differences in how pre- and post-migration factors and social determinants of health are associated with mental health among immigrants? (Study I and IV)

4 MATERIALS AND METHODS

The relationship between the research questions, individual studies, materials, and methods is shown in Table 3.

4.1 POPULATION

As a means of identification, all Swedish citizens or people living in Sweden with a permanent residence permit are assigned a personal identity number in the Population Registration System (101). After ethical approval and permission, researchers are able to link to registers for research purposes with the help of the personal identity number; the data are made anonymous after linkage. To be included in the studies, a person had to fulfil the criteria stated in Table 3, according to the Swedish Population Registration system (101). The number of persons in Sweden fulfilling the inclusion criteria at the time of the study determined the study sizes (see Table 4).

In Study I, II, and III, persons who could be assumed to have left the country without informing Swedish tax authorities were excluded by methods described by Weitoft (114). In Study III, the exclusion criteria were that the person had left Sweden prior to his or her death or the end of the study (censoring) in 2006.

All the individuals included in Study IV had a strong connection to the labour market at the start of the follow-up in 2000. This connection was defined according the criteria given by Lundin et al. (115): not being unemployed according to the Swedish employment service, not being sick listed or taking parental leave, not having a disability pension, and having an annual income above SEK 67,100. Prior to the start of follow-up, all participants were followed during a washout period for three years, 1997–99. Participants who were hospitalised for depressive disorders during the washout period were excluded from the cohort. Only immigrants who obtained resident permits prior to the start of the washout period in 1997 were included. Persons who had left Sweden were administratively censored from the year they left Sweden, according to a method described by Weitoft et al. (114). Persons who died during the time of the study were censored from the year of death. Refugees were excluded because studies have found them to be at a higher risk of poorer mental health than other immigrants (40). All who were hospitalised due to a depressive disorder prior to being unemployed were censored throughout the study. Persons who were sick listed for more than two-thirds of a year, were on a disability pension, or were taking parental leave were censored from the year they left the labour force. Censoring the sick listed was done to ensure that those who lost their jobs did not have a depressive disorder prior to transition to unemployment.

Table 3: The relationships between the research questions, individual studies, materials, and methods

Research question	Material: Outcome	Material: Exposure	Design & Methods	Inclusion criteria's/Study population	Study
1) Are there differences in mental health status between refugees and non-refugee immigrants, and could the hypothesised differences explain mental health differences by country or area of origin?	The Prescribed Drug Register	Longitudinal integration database for health insurance & labour market studies Longitudinal database for studies of the immigrants' integration	Cross-sectional design. Logistic regression analysis	All immigrants from Afghanistan, Iraq, Iran, the Middle East, Somalia, and the former Yugoslavia ages 18–64 in 2006 who were granted a resident permit fewer than ten years ago either for being a refugee or for the reason of family reunion with a refugee.	I
				Part 1: All registered immigrants ages 18–64 compared with all Swedish-born in the year 2006. Part 2: Immigrants from non-OECD-countries ages 18–64 years in 2006 who arrived in Sweden since 1993.	II
2) Do refugee immigrants have higher mortality rates than non-refugee immigrants?	The Cause of Death Register		Cohort design, time defined as years starting in January 1, 1998 to death or censoring on December 31, 2006. Cox regression analysis	Non-labour-market immigrants (including refugees and non-refugees such as persons admitted for family reunion with a refugee and for humanitarian reasons) to Sweden ages 18–64 in 1998–2006 who immigrated between 1992 and 1998.	III
3) Does the combination of general social determinants of health and post-migration factors increase inequalities among men and women in the relative risk of hospitalisation due to depressive disorder?	The Hospital Discharge Register		Cohort design, time defined in years, starting in January 1, 2000, to censoring in December 31, 2006. Cox regression analysis	The total population ages 18–64 in 2000–2006 with a strong connection to the labour market in 1999. Excluding persons hospitalised for depressive disorder during 1997–1999 and immigrants who arrived later than January 1997.	IV
4) Are there gender differences in how pre- and post-migration factors and social determinants of health are associated with mental health among immigrants?	The Prescribed Drug Register		Cross-sectional design. Logistic regression analysis	All immigrants from Afghanistan, Iraq, Iran, the Middle East, Somalia, and the former Yugoslavia ages18–64 in 2006 who were granted a resident permit fewer than ten years ago either for being a refugee or for the reason of family reunion with a refugee.	I

Table 4: Total population, percentage women, and percentage refugees in the four studies

	Part	Total population	Women %	Refugees %
Study I		43,168	48.5	56.5
Study II	One	5,507,262	49.3	1.6
	Two	298,641	51.5	15.4
Study III		86,395	49.3	24.2
Study IV		3,284,896	47.5	<0.5 (excluded)

4.2 EXPOSURES AND COVARIATES

The exposure variables and covariates are outlined in Tables 5 and 6. Covariates are all variables in a study that are not defined as exposures or outcomes. Some covariates are treated as modifiers, as defined above (section 2.1.3). Variables treated as modifiers are gender and country or area of origin. Some covariates are confounders. According to Rothman, a confounding factor has an effect that is imbalanced between the exposure groups. A confounder has to be associated with (i) the disease (outcome) (ii) and the exposure and (iii) should not be an effect of the exposure (116). Age, marital status, children at home, and place of residence in Sweden will be considered confounders. Not adjusting for these factors would create biased results. All exposure variables and covariates were retrieved from Statistics Sweden's Longitudinal integration database for health insurance and labour market studies (LISA by Swedish acronym) and Statistic Sweden's Longitudinal database for studies of the immigrants' integration (STATIV by Swedish acronym) (101). LISA has kept annual registers since 1990 and includes all individuals 16 years of age and older that were registered in Sweden as of December 31 for each year. It is updated every year, integrating existing data from the labour market and the educational and social sectors. STATIV includes data from different registers at Statistics Sweden, the Swedish Migration Board (SMB) and the Swedish Public Employment Service. Some registers overlap with LISA's. In addition, STATIV keeps registers of the reason for immigration, the date of residence, the year of immigration to the municipality, citizenship and housing, and school grades in the public courses in Swedish for Immigrants.

In Study I, II, and III the exposure variable reason for immigration (called immigrant subgroup in the manuscript of Study II) (see Table 3) was defined on the classifications used by the SMB (see 2.3.2 Pre-migration factors). Statistic Sweden performed a quality and validity check of the SMB classifications in 2010 (117, 118). Some problems were found. None of these problems concerned the classifications used in the studies, however.

Table 5: Exposure, Covariates and outcome in Study I and II

Study	Exposure	Covariates in both Study I &II	Covariates	Outcome
I	Reason for immigration: Refugees compared with non-refugees (reference category). In study I, non-refugees referred to persons who were granted a residence permit in Sweden for reasons of family reunion. The comparison group were not the refugee's own family members, but any person granted a residence permit because of family ties	Education: coded as 0–8, 9–10, 11–12, >12 or unknown duration of schooling Marital status: coded as single, married, divorced or widow/widow-er Age: coded as 18–24, 25–34, 35–44, 45–55 or 55–64 years	Country or area of origin: Coded as Afghanistan, Iraq, Iran, the Middle East, Somalia, and the former Yugoslavia Time in Sweden was coded as ten dummy groups by year	Prescribed psychotropic drugs: Including antidepressants (ATC-code N06A), anxiolytics (ATC-code N05B), hypnotics and sedatives (ATC-code N05C)
II part 1	Reason for immigration: Refugees compared with all non-refugee immigrants (reference category). Origin: Swedish born (reference category), from an OECD country or from a non-OECD country			Prescribed psychotropic drugs: Including antidepressants (ATC-code N06A), anxiolytics (ATC-code N05B), hypnotics, sedatives (ATC-code N05C), and antipsychotic agents (ATC-code N05A, including, e.g., lithium) were included
II part2 the non-OECD subset	Reason for immigration: Refugees compared with all non-refugees immigrants (reference category) Origin: Asia, Iraq (reference category), Iran, Middle East, North Africa, Latin America, the former Yugoslavia, the former Soviet Union, and Sub-Saharan Africa		Residence in Sweden: coded as metropolitan area (Stockholm, Gothenburg, Malmö), or other Years in Sweden: was coded as 0–5, 6–10 or 11–15 years Children at home: coded as yes, if children (under 18) were living in the person's household, otherwise, no	

Table 6: Exposure, covariates, and outcomes in Study III and IV

Study	Exposure	Covariates in both Study III &IV	Covariates	Outcome
III	Reason for immigration: Refugees compared with non-refugees (reference category) including family of refugees and persons who were granted residence permit for humanitarian reasons	Education: coded as less than 11 years of schooling, 11 years or more of schooling, & unknown length of schooling Marital status: coded as married or not married Age: coded as 18–24, 25–34, 35–44, 45–55 & 55–64 years	Residence in Sweden: coded as metropolitan area (Stockholm, Gothenburg, Malmö) or other Date of arrival: coded as: 1992–93, 1994–95 or 1996–98 Economic activity measured as employment status after five years in Sweden or, if a person died after fewer than five years in Sweden coded at the year of death	Causes of death according to ICD-9 and ICD-10 including all-cause mortality, neoplasms (ICD-9: 140-239) (ICD-10: C00−D48), cardiovascular disease (ICD-9: 390–459) (ICD-10: I00–I99), external causes (ICD-9: E800–E999) (ICD-10: S00−T98, V01−Y98) or all other causes
IV	Unemployment: Employed (reference category) compared with those who been employed but had (voluntarily or involuntarily) made a transition to unemployment and were still able to work Combination: Employed male Swedish born (reference category) compared with employed male foreign born, unemployed male Swedish born, unemployed male foreign born, employed female Swedish born, employed female foreign born, unemployed female Swedish born, and unemployed female foreign born		Economic resources were measured by the gross individual median income in the group with 90% confidence limits from paid employment together with all benefits based on social insurance, measured in Swedish kronor	Hospital admission for a depressive episode defined as F32 by ICD-10. This definition excludes recurrent depressive episodes and bipolar disorders as well as all other mood disorders

4.3 OUTCOME VARIABLES

All outcome variables were taken from registers administered by the National Board of Health and Welfare.

In Swedish register-based studies, poor mental health could be determined based on three principal outcomes of the patient. The first and most common option is inpatient care as used in study IV. This has the advantage of valid and reliable diagnoses; the disadvantage is that only persons with severe problems obtain inpatient care. The second option is the combination of inpatient and outpatient specialist care. This also gives high validity and reliability but unfortunately excludes primary outpatient care, where moderate psychiatric problems tend to be treated.

The third option is to use prescribed drug purchases as a proxy for poor mental health. Study I and II used prescribed psychotropic drugs as a proxy for poor mental health. To have purchased prescribed psychotropic drugs implies that a physician has clinically assessed the patient's symptoms as psychiatric in nature, and by using the prescription; the patient has confirmed the physician's decision. While using psychotropic drug purchases as a proxy is not ideal, the other options also have drawbacks. One advantage of using psychotropic drug purchases as a proxy is that these include prescriptions to outpatients from psychiatry as well as from other medical disciplines, including general practice, the most common form of care. Immigrants, particularly refugees (119), to Sweden are more likely to use psychotropic drugs than those who are Swedish-born (120). The greater use of antidepressants is almost entirely accounted for by higher morbidity (120, 121). For sedatives and hypnotics, the difference seems to have more to do with a difference in the treatment of minor psychiatric disorders between ethnic minorities in Sweden and Swedish-born residents (120).

In Study I and II, prescribed psychotropic drugs were used as a proxy for poor mental health (see Table 5) derived from the Swedish Prescribed Drug Register (managed by the National Board of Health and Welfare). It includes data since 2005 on all legally prescribed pharmaceutical drugs in Sweden (122). The differences between Study II and Study I was that in Study II antipsychotic drugs were added to the psychotropic drugs included in Study I.

For prescribed drugs in the year 2006, patients paid all costs up to 900 SEK (~US Dollar 130) per year; 50% of costs from 900 to 1,700 SEK; 25% from 1,700 to 3,300 SEK; and 10% from 3,300 to 4,300 SEK; after which all costs during the period are paid by the universal insurance (123). Thus patients paid, on average, about 22% of the actual cost of the prescribed drugs (123).

Studies among ethnic minorities in Sweden have cautioned against regarding specific diagnostic categories in psychiatric care as free from cultural considerations (37). To avoid relying on a particular diagnosis, different kinds of psychotropic drugs were included. Attitudes among patients and prescribers and communication barriers influence interpretation of a patient's poor mental health (18). Consequently, some groups might have been prescribed lower and weaker doses. For this reason, the

outcome variable was coded into a binary variable (has/has not been prescribed and purchased these psychotropic drugs).

In Study III, the outcome was mortality. For causes in detail, see Table 6. Unregistered deaths abroad can lead to invalidly low mortality rates compared with natives' rates (114). The age of retirement in Sweden is 65. Hence, after 64 the chance of spending long periods abroad with an increased risk of dying due to age creates a possibility of unregistered deaths. Statistics Sweden studied potential unregistered deaths and found a problem among immigrants more than 85 years of age (101). We addressed the risk of unregistered deaths by including only persons ages 18 to 64. Differences in unregistered deaths abroad by origin were addressed by adjusting for origin.

Study III used data from the Cause of Death Register (122). The diagnoses in the cause of death register are coded according to the international version of the International Classification of Diseases. Deaths are included in the registry irrespective of whether they occur in Sweden or abroad. Deaths abroad are registered either with the help of Swedish missions using Swedish death certificates or with domestic death certificates. International regulations for death certificates oblige physicians to report deaths according to the World Health Organisation's standards.

Study IV used hospitalisation due to a depressive disorder as an outcome. For a definition of Hospital admission for a depressive episode, see Table 4. It was taken from the Hospital Discharge Register (122). The validity of the diagnoses in the register has been tested and found to have an overall high quality (124). Swedish citizens and persons with a permanent residence permit pay 80 SEK (~US Dollar 12), per night in hospitalisation.

Because of large gender differences in the prevalence of the health outcomes for men and women, all four studies presented results for men and women separately. In addition to the gender-stratified analyses in Study IV, results were also presented with gender as a covariate. Statistics Sweden converted the amount of education completed outside Sweden into equivalent levels of schooling in Sweden; for some countries, however, these conversions of years in school might not be correct.

4.4 METHODS

4.4.1 Study designs

For study design, see Table 3.

4.4.2 Statistical analyses

The analyses were conducted with the SAS software package 9.2. In Study I and II, demographic variables were analysed using chi-square tests. The association between the exposure, covariates, and the outcome psychotropic drugs purchased was analysed using logistic regression. The -2Log Likelihood value was used to assess what model had the best fit. Results were presented as odds ratios (OR) with 95% confidence intervals (CI_{95}).

In Study III, the incidence rates were calculated as deaths per 10,000 person-years. Demographic variables were compared using chi-square and t-tests. Cox regression models were used to estimate hazard risk ratios (HR) for all-cause mortality and cause-specific mortality. These models were adjusted for age, age and origin, and age, origin, and covariates variables, respectively. The explanatory variables included in the final model were selected in a stepwise process. Tests of statistical power, as well as graphical and statistical tests of fulfilment of the Cox regression assumption of proportional hazards, were performed as suggested by Hosmer (125). Results were presented as HR with CI_{95}.

For Study IV, incidence rates were calculated as the number of hospital episodes for depressive disorder per 10,000 person-years. Cox regression models were used to estimate HR. The transition from employment to unemployment was coded binary, and subjects were split into an exposed and a non-exposed group and treated as distinct groups throughout as suggested by Clayton and Hills (126). The latter included those who had been employed (a criterion for being in the cohort) but had (voluntarily or involuntarily) made a transition to unemployment and were still able to work. Those who left the labour force were censored, according to the criteria stated above. Five models were fitted: the first included age group and unemployment; the second, age group, unemployment, and gender; the third, age group, unemployment, gender, and immigrant status; the fourth, age group, unemployment, gender, immigrant status, and education; the fifth, age group, unemployment, gender, immigrant status, education, and marital status. Best fit was tested with a stepwise procedure. In order to test if the combination created additional risk in the Cox regression model, a combination variable employment status-gender-immigrant status was tested, controlling for age, education, and marital status. Tests of statistical power, as well as graphical and statistical tests of fulfilment of the Cox regression assumption of proportional hazards, were performed as suggested by Allison (127). Results were presented as HR with CI_{95}.

4.4.3 Ethical considerations

All research can be abused, and particularly research involving groups at risk of discrimination and racism. Studies with a focus on ethnicity are at particular risk of enforcing stereotypes because ethnicity is hard to define but easy to misuse. The focus in the studies is to understand the social determinants of health. By focusing on factors that people and progressive policies can change, there is a chance that this study can lead to less stigmatization and thereby reduced discrimination and racism. All studies were approved by Stockholm Regional Ethical Review Board (2008/732-31).

5 RESULTS

5.1 REFUGEE MENTAL HEALTH (STUDY I & II)

Are there differences in mental health status between refugees and non-refugee immigrants, and could the hypothesised differences explain mental health differences by country or area of origin?

Study I showed that that refugees, both men and women; were significantly more likely to have poor mental health (for men OR = 1.47; CI_{95} = 1.32–1.64, for women OR = 1.53; CI_{95} = 1.41–1.66) than the referent category non-refugees. When adjusting for all covariates (duration of stay in Sweden, education, marital status, and age), refugee women in comparison to non-refugee women were found to have a significantly higher likelihood of poor mental health (OR=1.27; CI_{95} = 1.15–1.40); non-refugee men, however, did not differ significantly from refugee men (OR = 1.07; CI_{95} = 0.95–1.20).

Study II showed that non-OECD immigrant men had a significantly higher age-adjusted likelihood (OR = 1.37; CI_{95} = 1.35–1.39) of poor mental health than male OECD immigrants (OR = 1.15; CI_{95} = 1.13–1.16) and Swedish-born men (referent category). When including the term *reason for immigration* in the model, the likelihood did not change for male OECD immigrants but decreased significantly (OR = 1.29; CI_{95} = 1.27–1.31) for male non-OECD immigrants, although it was still significantly higher than for male OECD immigrants. For women, the only differences found in age-adjusted likelihood were between the Swedish-born women and immigrant women regardless of origin (OECD immigrants [OR = 1.11; CI_{95} = 1.10–1.13]) and non-OECD immigrants (OR = 1.11; CI_{95} = 1.10–1.12). When introducing *reason for immigration* in the model, it explained part of the higher likelihood among female non-OECD immigrants but not female OECD immigrants. In this new model the female non-OECD immigrants had a slightly higher likelihood compared with Swedish born (OR = 1.06; CI_{95} = 1.05–1.08).

In the second part of Study II, a sub-study of non-OECD immigrants was performed to explore if the reason for immigration could explain the origin-based difference among non-OECD immigrants. There were significant differences in odds ratios between many of the countries or areas of origin, as well as between non-refugees (referent category) and refugees (men OR = 1.24; CI_{95} = 1.19–1.30, women OR = 1.37; CI_{95} = 1.31–1.43). When both the country or area of origin (reference category Iraqis) and the reason for immigration were introduced in the age-adjusted model, the estimates did not change significantly for any parameter, except for a significant decrease for female refugees (OR = 1.27; CI_{95} = 1.22–1.33) compared with non-refugees (referent category).

In order to test whether the impact of the immigrant subgroup varied between different country or area of origin, the non-OECD sub-set was stratified by origin, and each origin was analysed separately, with reason for immigration and covariates (years in Sweden, education, marital status, age, area of residence, and children at home) included in the model. Compared with non-refugees, who were the referent category in each strata, refugees from Asia (men OR = 1.40; CI_{95} = 1.19-1.65 , women 1.96; CI_{95} =

1.69-2.28), Iraq (men OR = 1.14; CI_{95} = 1.04–1.25, women OR = 1.32; CI_{95} = 1.20–1.46), the Middle East (men OR = 1.46; CI_{95} = 1.21–1.76, women OR = 1.49; CI_{95} = 1.17–1.89), the former Yugoslavia (men OR = 1.14; CI_{95} =1.05–1.25, women OR = 1.13 ; CI_{95} = 1.04–1.21), the former Soviet Union (men OR = 1.47; CI_{95} = 1.08–1.99, women OR = 1.37, CI_{95} = 1.07–1.75), as well as male refugees from Latin America (OR = 1.27; CI_{95} = 1.03–1.56) had significantly higher likelihoods than non-refugees with the same origin. For immigrants from Iran, North Africa, and Sub-Saharan Africa and female immigrants from Latin America, there were no differences between refugees and non-refugees.

5.2 REFUGEE MORTALITY (STUDY III)

Do refugee immigrants have higher mortality rates than non-refugee immigrants?

Unadjusted incidence rates differed between male and female refugees and non-refugee immigrants for all causes and specific causes. The Cox regression assumption of proportional hazards was fulfilled. The statistical power was sufficient for all-cause mortality but weaker for some specific causes of death, especially cardiovascular disease and external causes for women.

In the first model, adjusted for age, the relative risk of mortality did not differ between refugees and non-refugee immigrants (referent category). Neither did the risk differ for all-cause mortality nor for any of the specific causes, apart from a lower risk of neoplasm among refugees (relative risk of mortality for refugees HR = 0.70; CI_{95} = 0.52–0.95). Adding country of origin to the model resulted in enhanced differences in the hazard ratios between male non-refugee and refugee immigrants for cardiovascular mortality (HR = 1.58; CI_{95} =1.08–2.33). Adding other covariates (residence in Sweden, year of arrival, economic activity, education, marital status, and age) increased the hazard ratios for refugees compared with non-refugees for cardiovascular mortality among both women (HR = 1.49; CI_{95} = 0.86–2.59, not significant) and men (HR = 1.53; CI_{95} = 1.04–2.24) and of external causes among men (HR = 1.59; CI_{95} = 1.01–2.50). The results regarding cardiovascular mortality appeared to be negatively confounded by origin. The size of the risk difference for cardiovascular mortality between refugees and non-refugee immigrants was similar among women and men, but the statistical power was lower among women.

5.3 THE COMBINATION OF FACTORS (STUDY IV)

Does the combination of general social determinants of health and post-migration factors increase inequalities among men and women in the relative risk of hospitalisation due to depressive disorder?

The unadjusted incidence rates indicated differences in rates of hospitalisation because of a depressive disorder by employment status during follow-up, by gender, and by immigrant status. Those who entered unemployment had a higher incidence than employed persons had. Women had a higher incidence than men had. Foreign-born persons had a higher incidence than Swedish born had. Females who experienced unemployment during follow-up had the highest incidence of hospitalisation for depressive disorder.

The model with the best fit included transition to unemployment, gender, immigrant status, education, age group, and marital status (full model). The model that included only employment status and age group (first model) was compared with the full model. In the first model, persons who experienced unemployment had a relative over-risk of hospitalisation (HR = 2.03; CI_{95} = 2.15–1.98) compared with those who did not experience it (reference category). Also in the full model, those who experienced unemployment had a higher relative risk (HR = 1.94; CI_{95} = 1.85–2.03) compared to the employed. In the full model, being female, being foreign-born, having low education, and not being married increased the relative risk for hospitalisation due to depressive disorders.

The full model was tested with stratification on gender. The relative risk for hospitalisation due to depressive disorders for men who experienced unemployment was higher than that of employed men (HR = 2.33; CI_{95} = 2.19–2.49). Unemployed women had a higher relative risk compared to employed women (HR = 1.62; CI_{95} = 1.53–1.73). When testing the full model, but stratified by immigrant status, the relative risk among Swedish born was higher among those who experienced unemployment compared with those who did not (HR = 1.99, CI_{95} =1.90–2.09). For foreign born too, the relative risk of hospitalisation for depressive disorder was higher among those who experienced unemployment during follow up (HR = 1.59, CI_{95} =1.40–1.80).

To test if the combination of transition to unemployment, being female, and foreign born increased the relative risk of hospitalisation for depressive disorders, a model was created with the combined variable *employment status–gender–immigrant status*, adjusted for age group, marital status, and education. Employed Swedish-born men (referent category) had the lowest relative risk of hospitalisation for depressive disorders. Higher relative risk but not significantly different from each other were employed male foreign-born (HR = 1.31; CI_{95} = 1.17–1.46) and employed female Swedish born (HR = 1.50; CI_{95} = 1.43–1.58). Even higher but not significantly different from each other were employed female foreign born (HR = 2.14; CI_{95} = 1.94–2.37), unemployed male Swedish born (HR = 2.26; CI_{95} = 2.12–2.42), and unemployed male foreign-born (HR = 2.45; CI_{95} = 2.13–2.82). Unemployed female Swedish-born had an even higher relative risk (HR = 2.62; CI_{95} = 2.45–2.80), however, and unemployed foreign-born females had the highest relative risk (HR = 3.47; CI_{95} = 3.02–3.98).

5.4 GENDER DIFFERENCES (STUDY I AND IV)

Are there gender differences in how pre- and post-migration factors and social determinants of health are associated with mental health among immigrants?

As mentioned in section 5.1, the results of Study I showed that when adjusting for socioeconomic factors, female refugees still had a higher likelihood of poor mental health compared to non-refugees, but this difference was not present for male refugees and non-refugees. As described in section 5.3, Study IV showed when combining unemployment with gender and immigrant status, immigrant women seem to be at the highest relative risk of hospitalisation due to depressive disorder following unemployment.

5.5 ADDITIONAL ANALYSIS

Study I and II used prescribed and purchased psychiatric drugs as a proxy for poor mental health. The difference between the proxy in Study I and II was that in Study II antipsychotic drugs were added to the other psychotropic drugs included in the proxy in Study I. Adding antipsychotic agents was tested in Study I, and this did not change the estimates significantly.

Study I, II, and III had the same definition of refugees. Quota refugees were included among the refugees. As opposed to refugees who have been asylum seekers, quota refugees know that they are granted residence permits from the day of arrival. The quota refugee share stays around 10%–20 % of the total refugee population. When testing the differences between quota refugees and those who have been granted asylum after seeking asylum in Sweden, the differences were small in terms of mental health. In terms of mortality, the statistical power was too low to test quota refugees separately.

In study III, fewer than 10% of the study population were excluded for leaving Sweden before death or censoring. An alternative way to exclude them would have been to censor those leaving Sweden or dying in the year when leaving Sweden for good as was done in Study IV. When testing this alternative way, censoring those who died or left Sweden during follow up, the estimates did not change significantly.

6 DISCUSSION

6.1 REFUGEE MENTAL HEALTH

Are there differences in mental health status between refugees and non-refugee immigrants and could the hypothesised differences explain mental health differences by country or area of origin? (Study I and II)

In Study I, post-migration factors (duration of stay in Sweden), modifiers (country or area of origin), other social determinants of health (education), and confounders (marital status and age) explained the differences between male refugees and non-refugees but not for females. In Study II, adjusted for age only, refugee men had a higher likelihood of poor mental health than all other, both non-refugees and Swedish born. Although all female immigrants had a higher likelihood of poor mental health than Swedish born had, refugee women did not have a higher likelihood of poor mental health than other immigrant women did. Among immigrants from non-OECD countries, adjusted for post-migration factors (years in Sweden), socioeconomic factors (education), and confounders (marital status, age, area of residence, and children at home), refugees from most countries or areas, but not all, had a significantly higher likelihood of poor mental health than non-refugees of the same origin did. These results show that there are differences in mental health status between refugees and non-refugee immigrants, and that it, in part, can explain mental health differences by country or area of origin.

A study by Tinghög et al. found that socioeconomic disadvantages explained low subjective well-being for European immigrants, but not for non-European immigrants (128). Study I and II adds to the Tinghög et al. findings that some of the poor mental health among non-OECD immigrants could probably be explained by a higher likelihood of poor mental health among the refugees present in this group. Immigrants to the United States have been found to have common mental disorders on a par with natives in most cases but not all (70–72). This is not apparent among immigrants in Europe (41). The high and varying proportions of refugees might be one of many reasons for the varying results in studies of common mental disorders among immigrants in Europe.

A number of interpretations could be proposed to explain why the reason for immigration had an impact in some groups but not in others. One is the interaction with the country of origin. Immigrants from countries or areas of origin with large differences between refugees and non-refugees, might come from places where the conditions could make the consequences of persecutions worse. Immigrants from countries or areas of origin with little difference between refugees and non-refugees, might originate from countries were the conditions are similarly bad for those who qualify for asylum and those who obtained residence permits for other reasons.

Another interpretation could be that asylum seekers from some countries or areas might be met with more suspicion than others are. Besides being subjected to the threats of persecution in the country of origin, the former group also experiences a more hostile asylum process in the new country. According to this explanation, the differences are

not in pre-migration factors but related to post-migration factors. Other post-migration factors could be differences in social networks, experiences of racism and discrimination, acculturation status, cultural integration, and status loss associated with the country or area of origin that modify the likelihood of poor mental health for refugees and non-refugees. In this thesis, however, it has not been possible to disentangle fully the effects of pre-migration and post-migration factors.

The reason for immigration was associated with mental health only among non-OECD immigrants. This is not surprising because very few refugees come from high-income countries. For non-OECD immigrants, the country of origin and the reason for immigration interacted. One implication of this is that the country or area of origin is not a valid proxy for the reason for immigration.

The finding that many refugees had a higher likelihood of poor mental health than their fellow compatriots underlines the previous criticism of attributing mental health differences to ethnicity or country of origin (7). Although there are countries or areas from where many are refugees, not all are refugees. No one can be assumed to have refugee experiences based on only their country or area of origin. Assuming this in epidemiological studies could result in an ecological fallacy. The country of origin is a relevant variable when analysing the mental health of immigrants in epidemiological studies. Still, differences by country of origin or ethnicity can hide structural differences such as the reason for immigration.

6.2 REFUGEE MORTALITY

Do refugee immigrants have higher mortality rates than non-refugee immigrants? (Study III)

There were no differences in the age-adjusted relative risk of mortality between refugees and non-refugee immigrants, apart from a lower relative risk of neoplasm among refugees. After adjusting for the country or area of origin and post-migration factors (year of arrival), general social determinants of health (economic activity and education), and confounders (residence in Sweden, marital status, and age), male refugees had a higher relative risk of mortality from cardiovascular diseases and external causes than male non-refugees did. The size of the increased relative risk of cardiovascular mortality among refugees was similar among women and men, but statistical power was lower among women.

Mortality among immigrants seems associated with pre-migration factors. This study shows that area or country of origin can confound mortality differences negatively, meaning that without adjusting for the country or area of origin, the differences between refugees and non-refugees were not visible. This shows that the country or area of origin is relevant in order to understand mortality differences; it does not reveal the whole picture, however.

What could explain the higher relative risk of cardiovascular mortality among refugees? Stress, including the stressor war combat injury (90), are known to be associated with cardiovascular mortality. One interpretation could be that exposure to

refugee-specific pre- and post-migration factors are harmful in a manner similar to war combat injury. Another reading could be that the association between refugee-specific pre- and post-migration factors and mortality are mediated by lifestyle factors known to increase the risk of cardiovascular mortality. Depression and PTSD are independent risk factors for cardiovascular disease (129, 130). An additional interpretation of the results could be that poor mental health among refugees increases the relative risk of cardiovascular mortality. Refugees have a harder time finding employment in Sweden, and unemployment is associated with mortality; still, the findings were adjusted for unemployment (economic activity), so this is probably not an explanation.

For male refugees there was an increased relative risk of death from external causes. Suicide accounted for about 40% of the external causes of death among men. There was not enough statistical power to test the relative risk of suicides separately. Study I and Study II, and many other studies, show that refugees have a higher likelihood of poor mental health. Persons with poor mental health have a pronounced over-risk of suicide, and studies show that refugees have a higher risk of suicidal thoughts and attempts (131). Fortune stresses the need for more studies on suicides among refugees (132). As already stated, this could not be done in Study III. The findings of this study could be an indication that the ethnic differences in suicide rates mask pre-migration factors.

The diagnostic criteria for PTSD in DSM IV (45) include the following criteria: *Criterion B: intrusive recollection* and *Criterion D: hyper-arousal* with the specific symptom *3. Difficulty concentrating*. An alternative interpretation of the relative over-risk of death from external causes among refugees, also associated with the higher likelihood of poor mental health among refugees, could be that PTSD increases the risk of accidents.

Studies and clinical practice involving immigrants from non-Western countries are sometimes criticised for the use of Western definitions of poor mental health in these populations. Study I and II applied a Western view of mental health problems. In these two studies, poor mental health was defined as a physician considering that the problems are of psychiatric nature, and the patient confirms it by filling the prescription. The mortality differences in Study III are less problematic in terms of cultural validity. The findings of Study III strengthen the theory that the reason for immigration is part of the immigrant-specific determinants of health that create social inequalities in health among immigrants.

Only refugee men had significantly higher relative risks of mortality compared to non-refugee immigrants. This could be due to low statistical power among women. Other explanations are possible, however. The results of Study I and III correspond to gender differences in Sweden; with a higher likelihood of poor mental health for women compared to men but lower mortality among women compared to men (111).

6.3 THE COMBINATION OF FACTORS

Does the combination of general social determinants of health and post-migration factors increase inequalities among men and women in the relative risk of hospitalisation due to depressive disorder? (Study IV)

Employment status, gender, immigrant status, education, and marital status were all associated with the relative risk of hospitalisation due to a depressive disorder. When the variables were combined, employed Swedish-born men had the lowest relative risk of hospitalisation for depressive disorders. Higher, but not significantly different from each other, were employed male foreign born, and employed female Swedish born. Even higher and not significantly different from each other were employed female foreign born, unemployed male Swedish born, and unemployed male foreign born. Unemployed female Swedish born had an even higher risk, and unemployed foreign-born females had the highest relative risk.

There are differences between men and women in terms of depression (64). It has been debated whether these gender differences are biological, because of adverse life events, socioeconomic differences, or gender-rated social status (133). Although women all over Europe have a higher likelihood of depression compared to men, there are differences in the size of the gap between men and women (133). In Study IV, women with a strong connection to the labour market had a higher risk of hospitalisation due to a depressive disorder following unemployment.

Llácer et al. highlighted the need for epidemiological studies on gender, migration and health (32). The combination of the variables of unemployment, gender, and immigrant status makes the social determinants even more unevenly distributed, and this creates additional inequalities. Study IV shows that it is possible and feasible to use the intersectional perspective in epidemiological research and when studying migration and health in an equity framework.

6.4 GENDER DIFFERENCES

Are there gender differences in how pre- and post-migration factors and social determinants of health are associated with mental health among immigrants? (Study I and IV)

Study I showed that there were mental health differences between refugees and non-refugees for both men and women. Country of origin and confounders explained this difference for men but not for women. There is more than one possible interpretation of the finding. One is that pre-migration factors, such as persecution, are worse or more harmful for women, explaining the difference between refugee and non-refugee women. Another is that post-migration factors are worse or more harmful for men, explaining the lack of a difference between refugee and non-refugee men.

Women have lower chances of being granted asylum, possibly due to gender-blind asylum procedures, which were highlighted by the Swedish Red Cross (29). If being granted asylum is particularly difficult for women, those women who are granted asylum are likely to have experienced worse persecutions than men have. This would

support the theory that female refugees have experienced particularly difficult pre-migration factors.

The interpretation that women are more susceptible to the same factors finds support too. In some studies women appear to be at greater risk of developing PTSD following trauma than men (134), although not in all samples (135). Roth suggests, however, that women and men are exposed to different kinds of traumas and that this exposure can be attributed to the sex differences (46). Laban et al. found that the asylum process plays an important role as a risk factor for poor mental health, especially for women (56). It is possible that the stresses and strains of the asylum hardship add up with the persecutions in the country of origin, which partly explains the likelihood of poor mental health among refugee women compared to non-refugees that is not found among men.

For men, socioeconomic factors and origin explained the difference between refugees and non-refugees. Could post-migration factors be worse or more harmful for men? As described in the Background (see section 2.1.3), Inglehart and Norris defined the gender-modernization process in two steps. Many immigrants to Sweden come from countries in the agrarian or industrial step of the gender modernization process. In a multi-methods study by Warfa et al., gender and mental health among Somalis moving to the United Kingdom or the United States were discussed in focus groups (136). Two hypotheses were proposed as a result of the focus groups. One was that migrating caused distress among men due to losing the traditional role of the breadwinner. The other was that migration caused distress for women due to the new demands in the new country. One interpretation of Study I is that women from agrarian and industrial societies gain in empowerment by moving to post-industrial societies, and this could counteract some negative post-migration factors, hence protecting them from distress. For men, migration could mean losing both socioeconomic and gender status. Therefore, post-migration factors would be more harmful for men.

Study IV shows that when the social determinants of health are combined foreign-born women who experience transition to unemployment seem to have the highest relative risk of depressive disorder. According to the role theory (described in section 2.3.5), immigrant women would have a lower relative risk of depressive disorder following unemployment. According to the theory of social disadvantages (described in section 2.3.5), female gender and immigrant status combined would mean increased relative risk. Study IV supports the theory of social disadvantages and shows that assumed traditional gender roles do not seem protective of immigrant women.

6.5 METHODOLOGICAL CONSIDERATIONS

6.5.1 Mental health in register-based studies among immigrants

Until lately, epidemiological methods using register-based sources have been rare in studies on poor mental health among immigrants, except for studies on psychosis (137). One reason for this could be the cultural component of mental health. Register-based studies can hardly take into consideration the cultural differences in perception and expression of mental health. Another is lack of information about discrimination and the experience of racism. There is support for labour market and housing discrimination

in Sweden (102, 138), and an ongoing debate about institutional racism within psychiatry in the United Kingdom, but nothing of this is accounted for within these studies. In a large meta-study by Fazel et al., the authors pointed out that the studies of PTSD among refugees that have few participants tend to report a higher prevalences than do studies with more participants (42). In another meta-study by Steel, the authors got similar results (139). These results point to the need for studies with large sample sizes when studying mental health in refugee populations in order to reduce the risk of type 1 errors. The advantages with register studies are the large number of participants; disadvantages are the lack of control of cross-cultural issues and discrimination and racism.

When conducting research on mental health using register data from health-care sources, the researcher has to rely on physicians reporting accurate diagnoses. If immigrants are compared to natives, cross-cultural misdiagnosing could create information bias. In Study I and the second part of Study II, this bias was partly avoided by comparing immigrants with immigrants and adjusting for country or area of origin. In the first part of Study II and Study IV, immigrants were compared with natives. In Study IV, hospitalisation due to depressive disorders implies severe cases at psychiatric wards. Thus, specialist psychiatrists give the diagnoses. This should lower the risk of information bias. Still, nothing is known of the awareness of cross-cultural aspects of depressive disorders among the specialists. When immigrants are compared with immigrants, cross-cultural misclassifications can create random errors. In Study I and Study II, this was dealt with by the large sample sizes.

One way of lowering the random and systematic errors due to cross-cultural mis-diagnosing is to avoid specific diagnoses. Instead, the outcome can be dichotomised into having poor mental health or not, such as in Study I and Study II. However, in the United Kingdom, South Asians have been found to be assigned mental health problem less often than white English despite having similar symptoms (18). This phenomenon could lower the prevalence ratio and potentially create systematic errors.

Other obstacles when studying poor mental health among immigrants using registered-based health-care data is culture-bound under- or over-utilisation of health services. In Study I and II part 2, this was dealt with by comparing immigrants with immigrants and adjusting for country or area of origin and time in Sweden. In Study IV, this could possibly dilute the association between being foreign born and hospitalisation following transition to unemployment. Part of the reason for under-utilisation is the pricing of health care services. Despite having a universal health insurance system with small out-of-pocket costs, a cost considered low among affluent groups could be burdensome for the disadvantaged (140). As Swedish-born in general have higher incomes than foreign-born, this can dilute the association of being foreign-born and prescribed psychotropic drugs in Study II.

The outcome in Study I and II was psychotropic drugs purchased because it implies that a physician has clinically assessed the patient's symptoms as psychiatric in nature, and by filling the prescription; the patient has confirmed the physician's decision. Prescribed antidepressants have been used as a proxy for poor mental health in one previous study (141). Still, this is a novel approach in a study of poor mental health

using a register-based design. The proxy has its limitations. First, it is not validated against any gold standard and lacks diagnostic control. Second, people who are prescribed psychotropic drugs are likely to have symptoms that are more serious; hence, the proxy is likely to miss those with minor symptoms. The lack of diagnoses in Study I and II makes it difficult to compare these studies to other studies. Using the proxy has the advantage that it includes data from psychiatry and other medical disciplines, as well as general practice and primary care.

The difference between the proxy in Study I and II was that in Study II antipsychotic drugs were added to the other psychotropic drugs included in the proxy in Study I. The reasons for excluding antipsychotic agents in Study I were that they are prescribed for severe mental illnesses known to have a much more complicated aetiology than those of moderately poor mental health. On the other hand, the potential misclassification of specific diagnoses of poor mental health among immigrants may have caused some immigrants to be prescribed antipsychotic agents instead of anti-depressive drugs, tranquilizers, or sedatives. This risk of misclassification might be higher when excluding antipsychotic agents as was done in Study I, creating invalid differences between immigrants of different origin.

6.5.2 Design

The studies of immigrant populations commonly use one of three ways of comparing. The first is immigrants with compatriots remaining in their country of origin (142). The second is immigrants with non-foreign-born descendants from the same country or of the same ethnicity. The third is foreign born with native born. Our study design in Study I, II, and III, comparing immigrants with immigrants from the same area or country of origin with different reasons for immigration, is novel.

Just like many studies of immigrants in high-income countries, Study I and Study II have a cross-sectional design. A cross-sectional design can give answers only about associations but says nothing of causality. Study III and IV had a cohort design. Eight (Study III) and six years (Study IV) of follow-up are limited time periods, and it would be interesting to follow the cohorts for longer. A number of measures in Study IV controlled the risk of selection (instead of causation), this is described in the methods section. Because depression could move between more or less pronounced phases, there could still be selection that is not controlled.

6.5.3 The exposure variable reason for immigration

In Study I, II, and III the exposure variable was *reason for immigration* with the parameters *refugee* or *non-refugee* defined according to the Swedish Migration Board's (SMB) classifications (see Table 2). The definition of being a refugee was the same in all three studies.

There are advantages and disadvantages of using the SMB's classifications of reasons for immigration. Advantages are that these are available data on reasons a person would be granted a residence permit in Sweden according to Swedish rules and regulations. Disadvantages are in terms of face validity; is the reason for immigration in the register similar to the real reason for immigration? Sweden is nowadays very restrictive in

terms of granting asylum, and the burden of proof rests on the applicant (43). The threshold to get asylum is high and requires adequate evidence; the refugee category is thus probably a valid category. The non-refugee category however, could include misclassified refugees. Refugees misclassified as family of refugees or refugees admitted for humanitarian reasons would weaken the association between the reason for immigration and the likelihood of mental health and mortality risk.

Study I, II, and III had different comparison groups, all called the non-refugee group (see Table 2). In both Study II and III, persons admitted for humanitarian reasons were included in the non-refugee group. Humanitarian reasons imply that the immigrant has been granted a residence permit due to circumstances in the current life situation. Persons admitted for humanitarian reasons could potentially have poorer mental health than other non-refugee immigrants have. Thus, in these two studies the association between outcome and being a refugee might have been underestimated.

In Study I, the non-refugees group included family members of refugees only, excluding persons admitted for humanitarian reasons. The comparison group was not the refugees' own families; it was instead any person who was granted a residence permit because of family ties. The reason was to keep the refugee group as similar as possible to the non-refugee group except for the refugee experience. An alternative interpretation of the results of Study I is that female refugees have a higher likelihood of poor mental health than non-refugee because they are the family of refugees, and hence have better social support and networks thanks to family in the new country. In support of this alternative explanation is a study by Norredam et al. (143). The authors compared the risk of psychiatric hospitalisation between Danish-born and immigrants who had been granted residence permits for family reunification with an immigrant (including family of both refugee and non-refugees). The Danish study found that female family reunification immigrants had an equal or lower risk of poor mental health as did Danish-born women. Could the results in Study I be explained by better social support among families of refugees? Probably not. The results were adjusted for marital status; hence, part of the family support was accounted for. Family support and networks might account for part of the lower likelihood among non-refugees, but this does not explain the differences between refugees and non-refugees. Families of refugees also are affected by the mental health of the refugee (144), diluting the association between the reason for immigration and mental health.

Study I and the second part of Study II had a similar approach. Still, the results were different. Study I compared persons with very similar situations: that is, they were from the same country, were not labour migrants, and no one had been in Sweden more than ten years. In Study II, the non-refugee group was more heterogeneous and included, for instance, the few labour migrants from non-OECD countries and persons with a connection to Sweden—that is, married to a Swede who had been in Sweden fourteen years or less. The heterogeneity of the population of Study II compared to the homogeneity of the total population of Study I can explain part of the differences.

Few large-scale epidemiological studies have focused on the reason for immigration among immigrants. Statistics Sweden has previously granted access to data only for the reason for immigration in aggregated categories that did not differentiate between

refugees and persons who had been granted residence permits for humanitarian reasons and not between the family of refugees and the family of labour immigrants. Study I, II, and III are the first studies using the SMB's unaggregated classifications for epidemiological purposes.

6.5.4 The variable country or area of origin

Country or area of origin can add much information in epidemiological studies of immigrants (for instance, 145), especially when the exposure and the outcome can be measured by face value—for instance by life-style factors, such as packs of cigarettes per week—or with biomarkers. Due to the cultural aspects of mental health, country or area of origin is harder to interpret. The categories of *area or country of origin* of Study I, II, and III resemble the categories in other register-based studies from the Nordic countries. Some studies use country or area of origin as a proxy for ethnicity and draw conclusions of the finding based on this assumption. Nazroo shows the risk involved in doing so, such as enforcing stereotypes (146). Although the ethnic categories in epidemiological studies are based on abstract and theoretical ideas, the effects of the findings of the study can become real in terms of stigmatization; hence, categorisation in epidemiological studies is always a normative act (147). Stratifying by ethnicity could sometimes hide racism and discrimination as risk factors for mental health, too. Another problem using one-dimensional identities such as ethnicity or religion when analysing mental health outcome is that the interpretations tend to focus on culture when structural discussion should be of more use.

Study II, part two, divided immigrants by origin according to whether the country or area of origin was a member of the OECD at the time of the study, 2006. This is a division by economic development in country of origin. Using OECD as a marker of immigrants from high-income countries as was done in Study II was previously done by Westman et al. (148). However, classifying immigrants according to income level in the country of origin could result in ecological fallacy. The relevant factors could rather be who has migrated to Sweden, the economic elite or the poor.

6.6 IMPLICATIONS

Social policies such as cash transfer programs and subsidised services are often directed towards social determinants of health. Policies in different high-income countries have different approaches in terms of design and generosity. Two common but opposing strategies are either focussing on the most disadvantaged or taking a universal approach reducing the steepness of the social gradient in health with an intensity that is proportionate to the level of disadvantage (proportionate universalism) (149, 150). Sweden has traditionally been practicing the latter (149).

What could reduce the social inequalities in health among immigrants in general and refugees in particular? The intersectional perspective acknowledges that different social determinants of health intersect in a complex interplay and that each social dimension affects any other dimension of inequality taken by itself. Looking at inequalities this way makes it difficult to define who is the most disadvantaged. The universal approach to reduce the general steepness of the social gradient has a better chance of supporting those in need of it, independent of whether a person is identified as being in a

disadvantaged group or not. It is important, however, that universal policies are truly universal and non-discriminatory. A truly universal policy would meet not just the needs of natives and immigrants but would benefit all marginalised groups. Policies aimed the supporting newly arrived immigrants to Sweden need to consider the different starting points depending on the reason for immigration.

Having a universal approach with an intensity that is proportionate to the level of disadvantage implies a high intensity of social policy directed towards refugees. In terms of health care for immigrants Ingleby stated, ". . . only sustainable, structurally embedded changes in all parts of the health system are capable of delivering the improvements that are needed" (151, p. 232.). This is especially true for health care for refugees and implies that health care targeting refugees needs to be part of the general health care chain, permanent and evidence-based.

Study I, II, and III demonstrate that the country or area of origin is a necessary and relevant variable when analysing the health of immigrants in epidemiological studies but that the variable at the same time can hide structural differences, such as the reason for immigration. Stressing the need for caution when interpreting results based on country of origin or ethnicity in epidemiological research does not imply that ethnicity or cultural practices are irrelevant in health care or in clinical settings. In fact, with a deeper understanding of cultural differences in the perception and expression of poor mental health, clinicians could improve not just health care but epidemiologic studies, too. Health care staff with a thorough understanding of cross-cultural differences will diagnose with greater accuracy; the diagnoses thus will be more valid. Valid diagnoses can in turn be used in register-based epidemiological research in order to find better ways to prevent poor health and promote public health.

Additional implications of this thesis are that health care staff in all fields needs more education and training in the relevance of pre-and post-migration factors, modifiers, and social determinants for mental health and mortality among immigrants to in order to diagnose with more accuracy and improve health care for immigrants.

6.7 FUTURE STUDIES

There is solid support for an immigrant's higher risk of schizophrenia and psychosis. The many suggested hypotheses of these high risks have been both biological and social, including racism and discrimination. No study has had the statistical power to test if refugees have an over-risk of schizophrenia and psychosis compared with non-refugees from the same countries. If refugees have an over-risk, this could strengthen the theory that social adversity has a role in the heightened risk among immigrant groups, and this will benefit an understanding of the aetiology of schizophrenia.

Studies of pre-migration stress and whether it interacts with the mental health consequences of racism and discrimination would be of importance. A life-course perspective on immigrant health would also add knowledge on the social determinants of health among immigrants. Studies on unemployment could test the impact in less heterogenic immigrant groups on depressive disorders. A study that would add much to the knowledge of newly arrived immigrants would be a study following this group from

day of arrival—longitudinal—to find out what factors are important in the reception because this could be useful for policy. Future studies should validate prescribed and purchased psychotropic drugs as a proxy for poor mental health, comparing it to a defined gold standard.

It would also be useful to test if poor mental health mediates the difference between refugees and non-refugee immigrants' mortality from cardiovascular diseases and external causes. Comparing mortality between refugees in other high-income countries would add to the knowledge of refugee mortality.

6.8 CONCLUSIONS

The overarching aim of this thesis was to increase knowledge of pre- and post-migration factors as well as social determinants of health and how they are associated with inequalities in mental health and mortality among refugees and other immigrants to Sweden. The studies supported the framework proposed in the background section, suggesting that pre- and post-migration factors and unevenly distributed social determinants of health create social inequalities in mental health and mortality among immigrants.

Study I and II have shown that for most groups, refugees have a higher likelihood of poor mental health than non-refugees do and that this can partly explain mental health differences by country or area of origin. Study III shows that refugee men have a higher mortality than non-refugee men do. Study IV shows that when the social determinants of health are combined unemployed foreign-born women seem to have the highest relative risk of hospitalisation for depressive disorder. The studies illustrate that in order to study mental health and mortality among immigrants, it is crucial to consider pre- and post-migration factors as well as general social determinants of health.

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